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ONTARIO

Ministry of the ENVIRONMENT

WATER POLLUTION SURVEY
OF THE
VILLAGE OF MAXVILLE
IN THE
COUNTY OF GLENGARRY

1973

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Ontario

Ministry of the
Environment

275 Ontario Street, Kingston, Ontario. K7K 2X5 546-3171

April 26, 1973

Mrs. V. MacGregor,
Clerk-Treasurer,
Village of Maxville,
Maxville, Ontario.

Dear Mrs. MacGregor:

Re: Village of Maxville -
Water Pollution Survey

We are pleased to submit a report on a survey of surface and groundwater quality conditions in the Village of Maxville together with the results and recommendations of our investigations. The recommendations are as follows:

1) Discharges of domestic wastes to storm sewers, ditches, and creeks should be eliminated.

2) Wells showing evidence of contamination should be repaired, if necessary, and disinfected to ensure that a bacteriologically safe water supply is being provided. It may be necessary to chlorinate some wells on a continuous basis.

3) Future growth in the Village of Maxville should be limited to areas where private water and sewage disposal systems will function properly.

We would be pleased to meet municipal officials to discuss the contents of this report.

Yours very truly,

GJM/jmc

L.G. South, P. Eng.,
Regional Engineer,
Sanitary Engineering Branch.

MIN. OF
THE ENVIRONMENT
ONTARIO
APR 27 1973
PRIVATE WASTE & WATER
MANAGEMENT BRANCH

WATER POLLUTION SURVEY

OF THE VILLAGE OF MAXVILLE

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INTRODUCTION

The purpose of this report is to summarize the water pollution conditions in the Village of Maxville as observed since 1968 by staff of the Regional Engineers Section of the Ministry of the Environment (formerly Ontario Water Resources Commission). During this period, a program was established to monitor the water quality in discharges from various ditches, storm sewer outfalls and creeks within the municipal boundaries. In addition, a sampling program was conducted to determine the groundwater quality in the private wells in the village.

LOCATION

The Village of Maxville is located in the north west section of the County of Glengarry approximately twenty-two miles from Cornwall. The community is composed of residential and commercial establishments. There is no industry in the village.

TOPOGRAPHICAL AND GEOLOGICAL CONDITIONS

Maxville is situated on a flat, drumlinized till plain which is locally overlain by clay deposits. The overburden varies in depth but is generally thin. The area is underlain by limestone of the Ottawa formation. The bedrock surface is essentially flat and slopes gently westward.

The land slopes in a north westerly direction in the village with the high point being located in the south end of the village at an elevation of approximately 375.0 feet and the low point being located in the north end of the village at an elevation of approximately 325.0 feet.

DRAINAGE

Since the village is located at the height of land between the Ottawa River and St. Lawrence River watersheds, there are no sizable streams near the municipality although a branch of the Scotch River has its source in the north west section of the village. Surface water flows to north west of the village and is conveyed via ditches, drains and storm sewers. Mr. A. Munroe, a plumber in the village, provided some valuable information on the location of storm sewers and his assistance is gratefully acknowledged.

POPULATION

According to the 1972 Municipal Directory, the population of Maxville was 751. As indicated in the following table, there has been a decline in population in the village in the past number of years:

Year	Population
1961	839
1966	776
1971	677

There are approximately 210 commercial and residential establishments in the village.

In view of the lack of industrial growth in the municipality, a substantial rate of growth is not envisaged. It is suspected that the population will continue to remain approximately the same in future years.

EXISTING WATER AND SEWAGE SERVICES

Private services are utilized as the method of servicing in the municipality. Water is obtained from drilled and dug wells, springs and cisterns. More explicit details on the private services will be provided later in this report.

Maxville Manor is served by two wells. The water is aerated to treat for hydrogen sulphide and is chlorinated prior to being pumped to the system. Sewage from the Manor is treated in an extended aeration sewage treatment plant and the plant effluent is directed to two tile beds.

The King George Hotel located on Main Street utilizes a small package-type sewage treatment plant and effluent is directed to the storm sewer.

SAMPLING STATIONS AND RESULTS

Samples were collected from seven stations and were submitted for bacteriological examination and chemical analyses. The results are shown in Appendix One. Two sets of samples were collected in 1968 and 1971, and single sets of samples were collected in 1969, 1970 and 1972. Samples were bacteriologically examined at the Ministry of Health Laboratory and the Ministry of the Environment Laboratory. Bacteriological examinations were conducted utilizing the Most Probable Number (MPN) and the Membrane Filter Methods.

The chemical samples were analyzed at the Ministry of the Environment Laboratory.

A description of the sampling station and the results of the samples are summarized as follows:

#1 - Sewer outfall from Mechanic Street at the west village limits. Storm sewers and drains located on Mechnnic Street West, Prince Street, Queen Street and King Street have a point of discharge at the above-mentioned location. The flow is directed to a small creek which flows northerly along the westerly village limits. There is usually a considerable flow at this station. The bacteriological examination results of samples collected at this point revealed that the total and fecal coliform population was quite high and although the 5 day BOD and suspended solids were not abnormally high for a storm sewer discharge, there is an indication that domestic wastes were present in the liquid being discharged from the sewer.

#2 - Sewer outfall from Catherine Street at Prince Street Storm drainage collected from Catherine Street, Church Street and Spring Street is discharged at this location into a small creek which runs westerly along the CNR tracks. The bacteriological sample results were high but the chemical analyses indicated that BOD and suspended solids levels were low. The flow at this point on August 15, 1972 was approximated at 3 to 5 gpm.

#3 - Sewer outfall from northend of Main Street. A storm drain which serves Main Street discharges at the north end of Main Street into a small creek. Samples collected from this point indicated that the bacteriological quality of the discharging liquid was unsatisfactory during each sampling period. With the exception of the samples collected on October 22, 1968, the BOD and suspended solids concentration were low. The flows from this sewer is usually minimal.

#4 - Sewer outfall from the northend of Marlborough Street. A storm sewer serving Marlborough Street discharges into a small creek at the north end of the village. The bacteriological results indicated high concentrations of coliform bacteria while the chemical results generally indicated low BOD and suspended solids levels. There is usually a low flow at this point.

#5 - Sewer outfall at the corner of Fair and Robert Street. Information could not be obtained regarding the area serviced by this storm sewer. It is suspected that the storm sewer serves Robert Street. The bacteriological and chemical results indicate the presence of domestic sewage. The flow is usually low.

#6 - Sewer outfall from west end of Alexander Street. Information could not be obtained regarding the street served by this sewer although it is suspected that it serves Alexander Street and perhaps King Street and John Street. The bacteriological and chemical sample results indicate the presence of domestic wastes. Flow was estimated at 5 gpm during August, 1972 sampling.

#7 - Creek at north village limits. Samples collected in the small creek on the west side of Marlborough Street indicated high coliform counts. BOD and suspended solids concentrations in the sample collected for chemical analyses did not exceed the Ministry's objectives for surface water.

SUMMARY OF RESULTS

All of the samples collected from the storm sewer outfalls and the creek indicated high coliform counts. The chemical analyses generally indicated that the BOD and suspended solids concentration were low and would not cause any serious degradation to the chemical quality of the receiving stream. By the presence of the high coliform counts, it is evident that there is some domestic wastes gaining access to the storm sewer system. Elimination of domestic waste discharges to the storm sewers should resolve the bacteriological pollution in the receiving stream.

SANITARY SURVEY

On August 14 and 15, 1972, a door-to-door survey was conducted in Maxville. The purpose of the survey was to determine the actual extent of the pollution problems related to contaminated private wells and inadequate sewage disposal systems. The method of waste disposal was determined and recorded. Information was obtained from the occupants of the dwelling or commercial establishment. In some cases, the occupant was unable to provide information on the private well and sewage disposal system. In addition to the staff of the

Sanitary Engineering Branch and the Private Waste and Water Management Branch of the Ministry of the Environment, assistance was provided by staff of the St. Lawrence & Ottawa Valleys Health Unit.

WELL SURVEY

Bacteriological Results

During the survey, a total of 159 private water supplies were sampled for bacteriological analyses. The following is a summary of the results:

SOURCE OF SUPPLY	NUMBER SAMPLED	*ADVERSE		**DOUBTFUL	
		TOTAL NUMBER	PERCENTAGE	TOTAL NUMBER	PERCENT
DRILLED WELLS	97	15	15%	5	5%
DUG WELLS	32	27	84%	1	3%
SPRINGS	3	1	33%	0	0
CISTERN	1	0	0	0	0
UNKNOWN	24	9	37%	1	4%
TOTAL	157	52	30%	7	4%

* ADVERSE - Greater than four coliform organisms present and/or fecal coliforms present.

** DOUBTFUL - Four or less coliform organisms present and/or fecal coliforms present.

From the above results, it can be concluded that the water obtained from dug wells had a high degree of contamination. This is probably due to the poor construction of the wells, inadequate casing or covers and/or the proximity of private waste disposal systems to the well.

Chemical Water Quality

During the survey, sixteen samples were collected from private wells in the village and submitted for chemical analyses. The results are summarized in Appendix Two. The water is hard to very hard. Seven of the sixteen wells yielded water containing iron in excess of the recommended maximum limit of 0.3 parts per million (ppm) for municipal purposes. Hydrogen sulphide gas is commonly found in groundwater supplies from the bedrock in the Maxville area. Hydrogen sulphide is present in water supplies as a result of the anaerobic decomposition of underground organic deposits. While generally considered undesirable because of their odours, such water is sometimes considered beneficial for health reasons.

SEWAGE DISPOSAL

During the survey, information was obtained on private waste disposal methods utilized by 156 establishments. This information is summarized as follows:

1. Number of establishments with septic tanks and tile beds (all sewage being discharged to system) - 133
2. Number of establishments with septic tanks and tile beds (wash water discharged to storm sewer) - 8
3. Number of establishments with septic tanks (septic tank effluent discharged to storm sewer) - 4
4. Number of establishments with cesspools - 5
5. Number of establishments with privies - 6

With this type of survey, it was not possible to determine whether the septic tank and tile beds were operating satisfactorily. It is suspected that a high percentage of the systems were functioning properly. To reduce the pollution load to the storm sewers, direct domestic waste discharges or discharges from septic tanks should be eliminated. The inadequate systems, as determined during the survey, were located on Main Street, Mechanic Street, Alexander Street and Marlborough Street. From visual observations, it would appear that most of these problems could be solved on an individual basis. It may be necessary to install holding tanks to serve some properties on Main Street where there are lots of insufficient size to accommodate septic tank and tile bed systems.

COMMUNAL WATER AND SEWAGE WORKS PROJECTS

At the request of municipal council, water and sewage works projects were initiated in 1968. A groundwater survey was conducted within a two mile radius of Maxville in September 1969 with the objective of the survey to evaluate local groundwater conditions and to locate potential test-well sites in order to meet the requirements of a municipal water-supply system. In view of the poor hydrogeologic characteristics of the overburden and bedrock near the municipality, it was recommended that no test-drilling program be undertaken. Subsequently the survey was extended to include an area within a five mile radius. However the conclusions and recommendations of the second survey remained virtually unchanged. The economics of utilizing a surface water supply seemed prohibitive since the closest adequate source of surface water would be Loch Garry located eight miles from the village.

Since there is no receiving stream in the Maxville area of any significant size, it would not be possible to construct a sewage treatment plant with a direct discharge to a watercourse. Development of a sewage works project would necessitate the construction of a lagoon and spray irrigation system.

In April 1971, a brief was presented to council outlining tentative cost estimates for water and sewage systems to serve the existing built-up area of the village. The water works project included a distribution system, treatment plant to treat water from Loch Garry, trunk mains, pumping facilities and storage facilities. The sewage works project consisted of a sewage collector system, pumping station, forcemain, lagoon and spray irrigation facilities. The amount of Provincial financial assistance used in the analysis was a maximum of 50 percent. Based on a 40 year financing period at an interest rate of 8%, the typical annual home charge to recover the total costs was $344.05 for water and $266.92 for sewage. Based on this analysis, the economics of providing communal water and sewage works projects for the municipality ruled out the feasibility of such systems.

As a result of a recent announcement by the Ministry of the Environment regarding increased financial assistance to small municipalities to a minimum of 75 percent, there has been some renewed interest in developing water and sewage works. However the economic feasibility of such projects can again be questioned.

SUMMARY

A water pollution survey conducted in the Village of Maxville has revealed that there are water pollution problems in the village. Sampling of storm sewer outfalls shows the presence of coliform bacteria and periodic discharge of wastes from some sampling points exhibiting high BOD and suspended solids concentrations. The survey in August 1972 revealed that there are a number of inadequate private sewage disposal systems in the community.

Samples of water collected from individual private water systems indicated that thirty percent of the private sources were contaminated. Eighty-four percent of the dug wells sampled were contaminated. Repairing the existing well structures would probably assist in preventing surface drainage from gaining access to the dug wells and thus improve the quality of the groundwater. The chemical analysis of the groundwater indicates that the water is hard and in some cases has a high iron concentration. Hydrogen sulphide is found in some wells.

In 1968, water and sewage works projects were initiated for the Village of Maxville. However, groundwater surveys revealed that there was little probability of locating a well(s) capable of serving the entire village with communal water. The inadequacy of local streams to assimilate a sewage treatment plant effluent prevents the construction of a sewage treatment plant to serve the village. If a communal sewage works system were to be installed, it would be necessary to construct a lagoon and spray irrigation system. Cost estimates provided by the Ministry of the Environment in 1971 ruled out the economic feasibility of constructing communal systems using a surface water supply from Loch Garry and lagoon and spray irrigation for sewage disposal. Although the costs to the taxpayer would be reduced with the increased financial assistance provided by the province, the costs of communal services are still expected to be quite high.

RECOMMENDATIONS

1. Discharge of domestic wastes to storm sewers, ditches and creeks should

be eliminated.

2. Wells showing evidence of contamination should be repaired, if necessary, and disinfected to ensure that a bacteriologically safe water supply is being provided. It may be necessary to chlorinate some wells on a continuous basis.
3. Future growth in the Village of Maxville should be limited to areas where private water and sewage disposal systems will function properly.

GJM/jmc

Report prepared by..........................
G.J. McKenna, P. Eng.,
Sanitary Engineering Branch.

APPENDIX ONE

VILLAGE OF MAXVILLE

WATER POLLUTION SURVEY

SAMPLE POINT	DESCRIPTION	DATE	5-DAY BOD	S O L I D S			COLIFORM ORGANISMS	
				TOTAL	SUSP.	DISS.	TOTAL	FECAL
1.	Sewer outfall from Mechanic St. at west village limits.	Apr.24/68	2.9	562	8	554	11,000+	11,000+
		Oct.22/68	3.3	614	4	610	11,000+	11,000+
		Oct.15/69	12.0	730	250	480	75,000	75,000
		Apr.29/70	6.0	450	15	435	260,000	0
		May 26/71	2.0	380	10	370	38,000	3,800
		Aug.11/71	7.5	580	70	510	6,600,000	43,000
		Aug.15/72	7.0	-	400	-	200,000	10,00
2.	Sewer outfall from Catherine St. at Prince St.	Apr.24/68	3.1	410	3	407	11,000+	11,000+
		Oct.22/68	5.2	482	6	476	11,000+	11,000+
		Oct.15/69	6.0	530	110	420	54,000	42,000
		Apr.29/70	4.0	480	20	460	62,000	33,000
		May 26/71	6.0	420	5	415	280,000	32,000
		Aug.11/71	6.0	370	70	300	217,000	1,100
		Aug.15/72	3.5	-	5.0	-	8,000+	8,000+
3.	Sewer outfall from northend of Main St.	Apr.24/68	2.6	582	7	575	11,000+	11,000+
		Oct.22/68	220	1534	167	1367	11,000+	11,000+
		Oct.15/69		insufficient flow for sampling				
		Apr.29/70	0.8	760	5	755	500,000	80,000
		May 26/71	7.0	520	10	510	520,000	120,000
		Aug.11/71	8.5	350	35	315	244,000	2,900
		Aug.15/72	3.0	-	0	-	8,000+	8,000+
4.	Sewer outfall at corner of Fair & Robert Sts.	Apr.24/68	1.8	322	4	318	11,000+	11,000+
		Oct.22/68	61	998	165	833	11,000+	11,000+
		Oct.15/69		insufficient flow for sampling				
		Apr.29/70	0.6	310	5	305	43,000	185
		May 26/71	19	300	15	285	3,800	300
		Aug.15.72	2.5	340	5	335	560,000	35,900
		Aug.15/72	11.0	-	5	-	8,000+	8,000+

APPENDIX ONE - Cont'd.

SAMPLE POINT	DESCRIPTION	DATE	5-DAY BOD	SOLIDS			COLIFORM ORGANISMS	
				TOTAL	SUSP.	DISS.	TOTAL	FECAL
5.	Sewer outfall at corner of Fair & Robert Sts.	Apr.24/68	2.6	486	4	482	11,000+	4,200
		Oct.22/68	21	814	251	563	3,800	3,000
		Oct.15/69	40	1430	880	550	6,100	200
		Apr.29/70	1.0	430	10	420	310,000	290,000
		May 26/71	24	480	80	400	17,000	9,000
		Aug.11/71	80	580	80	500	700,000	16,000
		Aug.15/72	6.0	-	30	-	8,000	2,900
6.	Sewer outfall from west end of Alexander St.	Apr.24/68	13	642	44	598	11,000+	11,000+
		Oct.22/68	45	732	46	686	11,000+	11,000+
		Oct.15/69	3200	5180	4380	800	240,000+	240,000+
		Apr.29/70	2.5	550	10	540	1500,000	35,000
		May 26/71	75	650	80	570	370,000	200,000
		Aug.11/71	38	740	370	370	2080,000	84,000
		Aug.15/72	14	-	20	-	8,000+	8,000+
7.	Creek at north village limits.	Aug.11/71	2.0	330	15	315	11,400	520
		Aug.15/72	4.0	-	5	-	80+	80+

APPENDIX TWO

CHEMICAL RESULTS OF PRIVATE WELLS

LOCATION	HARDNESS as $CaCO_3$	Iron as Fe	Chloride as Cl	Nitrogen as N	MBAS as LAS
1. Mr. E. Michaud, Alexander St.	280	0.05	31	0.09	<0.1
2. Mr. R. Rolland, Main St.	200	<0.05	23	<0.01	<0.1
3. Mrs. P. Cameron	396	<0.05	28	2.5	<0.1
4. Mr. G. Leek, Catherine St.	236	0.40	5	0.13	<0.1
5. MacEwen Hardware, Main Street	282	0.70	7	0.28	<0.1
6. Mrs. A. Hughes, Main St.	200	0.05	12	0.21	<0.1
7. Mr. H. Scott, Mechanic St.	230	0.20	30	0.04	<0.1
8. Mr. A. Chillerier, Queen Street	432	0.35	24	0.09	<0.1
9. E. Murray, Robert Street	356	0.40	16	0.01	<0.1
10. Mr. G. Viau, Spring Street	352	0.15	70	1.4	<0.1
11. Mr. N. Chisholm Catherine Street	320	0.40	5	0.31	<0.1
12. Mr. B. Besner	332	<0.05	6		

CHEMICAL RESULTS OF PRIVATE WELLS - cont'd.

LOCATION	HARDNESS as $CaCO_3$	Iron as Fe	Chloride as Cl	Nitrogen as N	MBAS as LAS
13. Mr. J. McCartney, Alexander Street	348	0.35	60	0.01	<0.1
14. Mr. J.Y. Marshall Peter St.	372	0.15	16	0.30	<0.1
15. Mr. S.G. MacDonald, Peter St.	244	0.45	7	0.04	<0.1
16. D. MacGregor, Mechanic St.	580	0.15	26	0.60	<0.1

Notes

1. All results reported in parts per million (ppm)
2. Ministry objective for iron - 0.3 ppm as Fe
3. Ministry objective for nitrate - 10.0 ppm as N
4. Groundwater is very hard
5. Methylene Blue Active Substances as Linear Alkylate Sulphate (MBAS as LAS) - Briefly, this is a measure of detergents in the water. Usually the presence of detergents in natural waters indicates contamination by domestic wastes. None of the wells sampled revealed the presence of MBAS.

APPENDIX THREE

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

The analyses employed to assess the water quality of the samples collected during this survey: total coliform, fecal coliform, Biochemical Oxygen Demand (BOD), and suspended solids.

BACTERIOLOGICAL EXAMINATION

The bacteriological indicators of contamination used during the survey were the total and fecal coliform organisms. Coliform organisms were found in human excrement, animal excrement and the soil. The fecal coliforms are indicators of human or animal wastes.

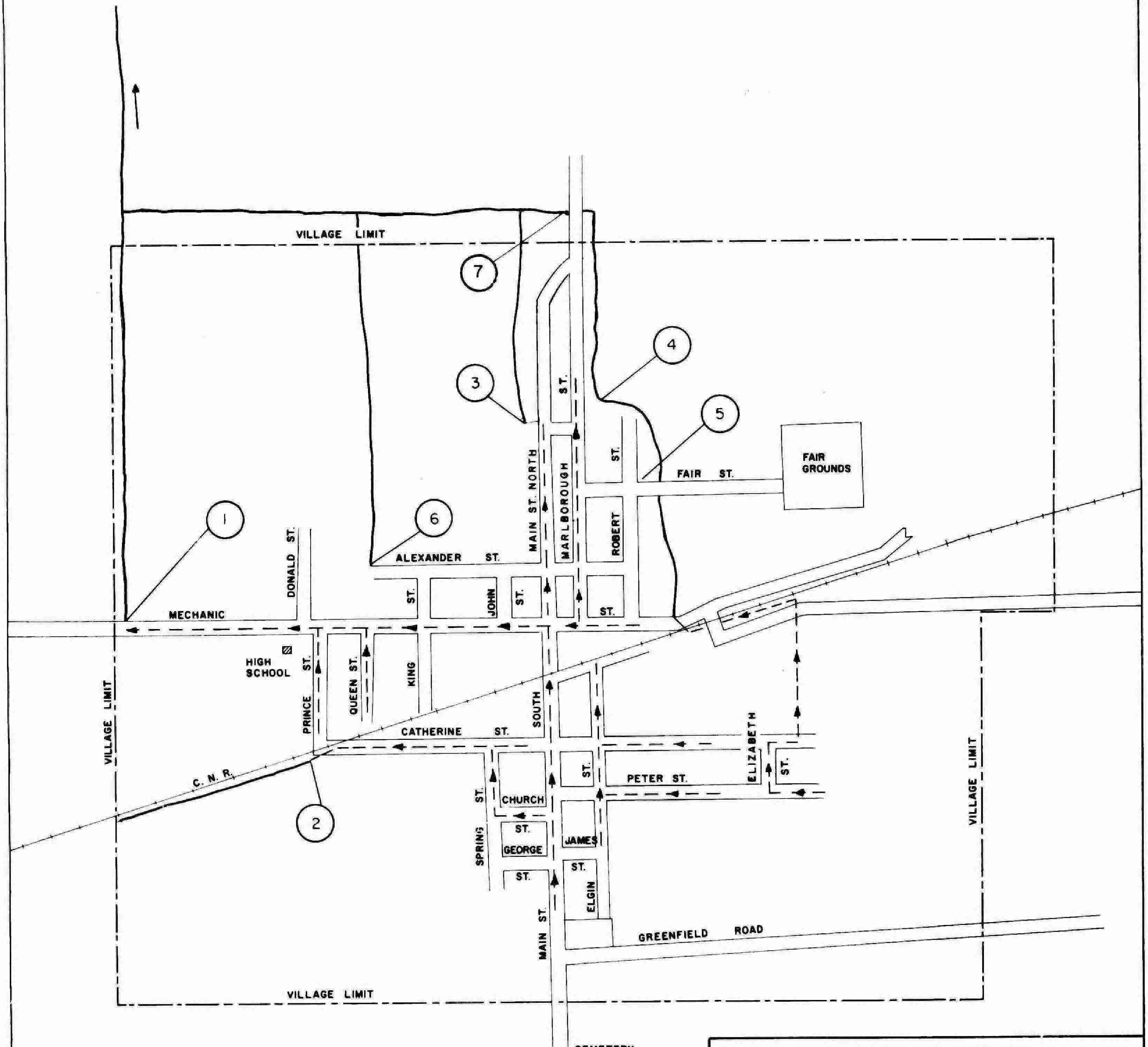
SANITARY CHEMICAL ANALYSES

Biochemical Oxygen Demand (BOD)

This test evaluates the loss of dissolved oxygen that accompanies the decomposition of organic matter carried out by organisms. It is an indirect measure of the amount of decommosable matter present and the direct measure of the respiratory oxygen requirement of the living organisms responsible for decomposition. A 5-day BOD determination with incubation at 20^{o}C is reported. A high BOD is indicative of organic or chemical pollution. In most cases adequate protection for surface waters should be provided if BOD concentrations in waste discharges exceed 15 ppm, but in some cases a much higher concentration can be tolerated while in other cases a concentration less than 15 ppm could be detrimental. Special situations have to be examined individually. This will ensure that the biochemical oxygen demand from the various sources does not lower the oxygen concentration in the watercourse below 6 - 7 mg/litre and thus make the watercourse unacceptable for various fresh water biota.

Suspended Solids

The suspended solids value is the most significant of the solids determination and indicates the measure of the undissolved solids of organic or inorganic nature. The effects of suspended solids in water are reflected in difficulties associated with water purification depositions in streams and injury to the habitat of fish. In most cases, adequate protection for surface waters should be provided if suspended solids concentrations in waste discharges exceed 15 ppm.



LEGEND

① – SAMPLING POINT

– – – – – – – – APPROXIMATE LOCATION OF DRAINS & STORM SEWERS

ENVIRONMENT ONTARIO

VILLAGE OF MAXVILLE

WATER POLLUTION SURVEY

1972

SCALE: 800 400 0 800 FT.	
DRAWN BY: R. SHISHKOFF	DATE: JUNE 1968
CHECKED BY:	DRAWING Nº: 68 - 67

Date Due

ONTARIO
MINISTRY OF THE ENVIRONMENT
Water Pollution Survey of the
Village of Maxville in the County
of Glengarry 1973
TERMINAL STREAM: SOUTH NATION R.

DATE	ISSUED TO

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